



Re: Bobelyak M, Vaculik J, Stepan JJ. Bone mineral density assessment using Radiofrequency Echographic Mult Spectrometry (REMS) in patients before and after total hip replacement, *Osteoporos Int* 2025;https://doi.org/10.1007/s00198-025-07685-w and Re: Pocock N, Chan D. Editorial: Is REMS-BMD truly a measured parameter? A call for transparency and technical clarification, *Osteoporos Int* 2025;https://doi.org/10.1007/s00198-025-07699-4

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Dear Editor,

We read with interest the article by Bobelyak and colleagues and the accompanying Editorial. However, we have serious concerns about the article's methodology and conclusions. The authors reported REMS-BMD measurements at the proximal femur in patients before and after hip arthroplasty and, based on minimal changes in BMD and variations observed with different anthropometric inputs, concluded that REMS-BMD is essentially derived from age, sex, and BMI rather than from ultrasound spectral data. This conclusion is not supported by the evidence provided, which highlight instead technical errors and misinterpretations of REMS operating principles, as detailed below.

1. *Misplacement of the ultrasound probe caused misinterpretation of REMS measurements over prostheses.* The authors suggest that REMS provided values “measured in the metal material of the endoprosthesis.” However, as shown in the article Fig. 1C–D, the femoral neck, which according to the manufacturer's scanning protocol should occupy the central part of the image, is in fact absent (otherwise the femoral head would have been visible laterally). Instead, the structures shown are consistent with the trochanter region, where the pres-

ence of residual bone is confirmed in Fig. 1B. Thus, the ultrasound probe was incorrectly positioned, leading the software to misinterpret the trochanter as the femoral neck. This methodological flaw offers a straightforward explanation for the reported similarity of “femoral neck” REMS-BMD values before and after arthroplasty: the device investigated just the trochanter, representing a bone region whose BMD is not affected by surgery, as explained in Fig. 1 below.

2. *Misinterpretation of the role of anthropometric parameters.* The integration of age and BMI into REMS calculations is documented in the literature (e.g., in cited ref. [12]). Reference spectral models are stratified by sex, age, and BMI, and the Osteoporosis Score is subsequently converted to BMD through equations dependent on those parameters. Therefore, erroneous inputs cause the selection of inappropriate reference models and equations, thus yielding unreliable results. This is demonstrated in article Fig. 5: correct age and BMI inputs yield a broad differentiation of BMD values among patients, while extremely unrealistic inputs collapse values into a narrow, unreliable range. Rather than showing that REMS-BMD is calculated solely from anthropometric data, these findings simply illustrate the expected consequences of deliberately misusing the device.
3. *Overstatement on the actual significance of mathematical modelling of BMD calculation.* Independently of

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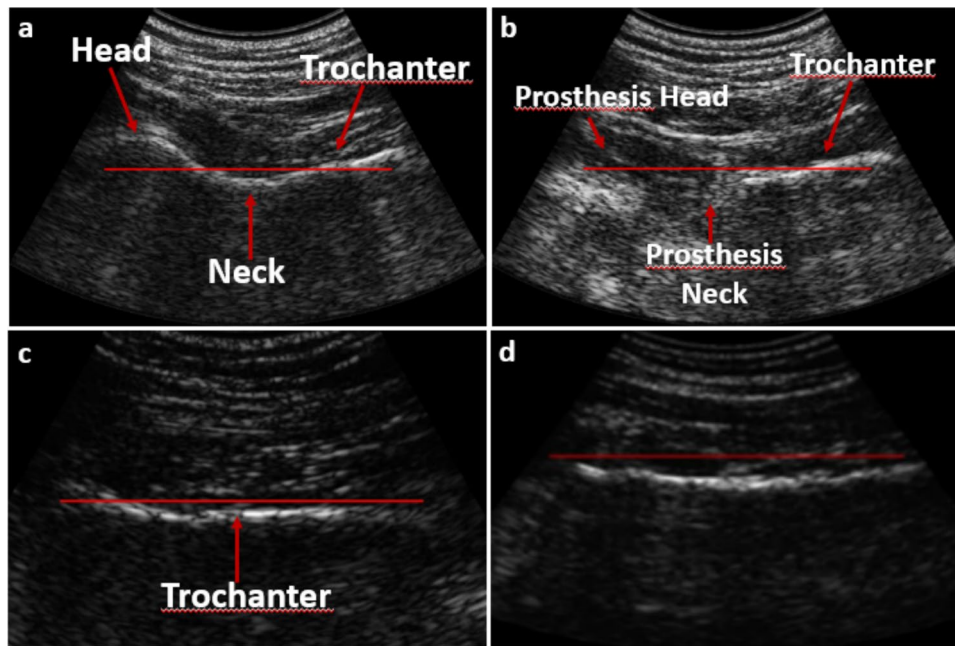


Fig. 1 REMS scans on proximal femur: **a** correctly acquired femoral neck in the absence of prosthesis; **b** visual appearance of a prosthesis-bearing proximal femur at REMS scan: the head and neck areas are full of image artefacts due to metal presence and the typical proximal femur profile is definitely not visible (such a REMS scan does not provide any result because of automatic discarding of artefacts); **c** REMS scan of a prosthesis-bearing proximal femur with malpositioning of the ultrasound probe on trochanter (please note that the signal contribution from the prosthesis—not visible—is anyway

automatically excluded from REMS output as typically done for artefacts). However, such a REMS scan actually provides a bone density measurement, which was obtained on the trochanteric bone only, misinterpreted as the femoral neck due to the malpositioning; **d** Fig. 1D from Bobelyak et al., which was presented as after surgery acquisition (please, note the extreme difference with **a** and **b**, and the similarity with **c**, confirming in any case the wrong probe positioning in Bobelyak et al.)

REMS, the literature reports several papers describing mathematical models for the estimation of DXA-BMD based on demographic and anthropometric parameters only, achieving correlation levels comparable to those reported for REMS-BMD in the referred paper, and in larger populations [1–4]. However, this does not imply that DXA-BMD measurement is useless or can be replaced by mathematical estimations. Furthermore, the proposed model showed a good performance just in a limited cohort of 50 patients, all presenting advanced hip osteoarthritis and no fragility fractures, but its generalizability to broader and more heterogeneous populations remains far from being demonstrated.

In summary, the article study suffers from important methodological flaws that seriously compromise its reliability, invalidating the claim that REMS-BMD is determined only by age, sex, and BMI, and the same is also true for the Editorial. In conclusion, the editorial board may formally recommend to withdraw the papers from the journal to ensure scientific accuracy.

Sincerely,

Al-Daghri N., Alenad A., Alokail M., Bahat G., Beaudart C., Birch N., Bischoff E., Brandi M. L., Bruyère O., Cafarella C., Campusano C., Casado E., Cavalier E., Chandran M., Cortet B., Diez-Perez A., Giusti F., Gonnelli S., Guglielmi G., Halbout P., Hough T., Jiwa F., Kurth A., MacLaughlin E., Maggi S., Matijevic R., Messina C., Messina OD., Njeze N., Reginster JY., Rizzoli R., Sabico S., Schmidmaier R., Suzuki A., Tarantino U., Tüzün S., Zakraoui L., Zambito K.

Declarations

Conflicts of interest Maria Luisa Brandi received honoraria for being part of the international scientific Board; Andreas Kurth received honorarium as a speaker of one international company-sponsored symposium of Echolight; Jean-Yves Reginster received fees as a Speaker's Bureau of Echolight, the manufacturer of REMS; he is President of ESCEO, a not-for-profit organization having received Unrestricted Educational Grants from Echolight, the manufacturer of REMS; he is Secretary General of the International Osteoporosis Foundation, a Swiss foundation having received financial supports from Echolight, the manufacturer of REMS; he is Chairman of the IOF-ESCEO-World Congress on Osteoporosis, Osteoarthritis and Musculoskeletal Dis-

eases (WCO), a Congress which has received financial support from Echolight, the manufacturer of REMS; René Rizzoli participated in an ESCEO working group reviewing Echolight technology, he participated in two workshops on the technique and was coauthor of two reviews; Nasser Al-Daghri N, Amal Alenad, Majed Alokail, Gülistan Bahat, Charlotte Beaudart, Nick Birch, Elena Bischoff, Olivier Bruyère, Carla Caffarelli, Claudia Campusano, Etienne Cavalier, Manju Chandran, Bernard Cortet, Enrique Casado, Adolfo Diez-Perez, Francesca Giusti, Stefano Gonnelli, Giuseppe Guglielmi, Philippe Halbout, Tereza Hough, Famida Jiwa, Edmund MacLaughlin, Stefania Maggi, Radmila Matijevic, Carmelo Messina, Osvaldo Daniel Messina, Ngozi Njeze, Shaun Sabico, Ralf Schmidmaier, Atsushi Suzuki, Umberto Tarantino, Şansın Tüzün, Leith Zakraoui, Kimberly Zambito, declare no competing financial interests.

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